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The Plants of Kaho'olawe

by
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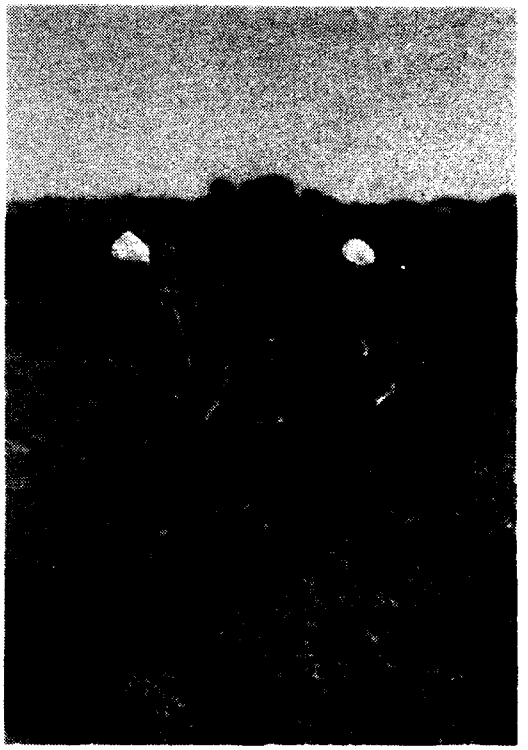
For at least two centuries prior to World War II, the Hawaiian island of Kaho'olawe suffered the ravages of periodic wildfires, slash-and-burn agriculture, and severe overgrazing, leaving the island almost barren of vegetation. With the entry of the United States into World War II, Kaho'olawe, then part of the U.S. Territory of Hawaii, became a focal point for military training in the South Pacific. In 1953 the uninhabited island was placed under the jurisdiction of the U.S. Navy. Today, legislation is in progress to return the island to the State of Hawaii.

From 1987 to 1993, the U.S. Army Construction Engineering Research Laboratories (USACERL) worked with the U.S. Navy to develop a cost-effective land rehabilitation prescription for Kaho'olawe. As part of that effort, a study was undertaken to determine, as nearly as possible, the original plant species of the island. This report, containing former and extant plant species, is the product of that study. The list of plant species will be included in a natural resources data base for use in future land rehabilitation projects on Kaho'olawe.



Prickly poppy (*Argemone glauca*), a native species, survives on the barren Kaho'olawe landscape.

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Foreword

Funding for this study was provided by the Commander, Naval Base Pearl Harbor, under Reimbursable Order No. N6144988P007409. The project was overseen through the Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, HI. The technical monitor was Stefanie Aschmann of the Pacific Division, Naval Facilities Engineering Command.

The work was performed by the Environmental Natural Resources Division (EN) of the Environmental Sustainment Laboratory (EL), U.S. Army Construction Engineering Research Laboratories (USACERL). The USACERL principal investigator was Dr. Steven D. Warren. Dr. William Severinghaus is Acting Chief, CECER-EN, and Dr. William Goran is Chief, CECER-EL. The USACERL technical editor was Thomas E. Rice, Information Management Office.

The authors thank the staff of the Bernice Pauahi Bishop Museum, Honolulu, Hawaii, for access to historical records and herbarium materials. Thanks are also extended to Hardy Spoehr of the Kaho'olawe Conveyance Commission for providing a copy of the Hawai'i Heritage Program report cited in the References.

LTC David J. Rehbein is Commander, USACERL, and Dr. L.R. Shaffer is Director.

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DISTRIBUTION

1 Introduction

Background

Researchers have speculated that much of the Hawaiian island of Kaho'olawe was at one time covered with a dryland scrub forest similar to remnants of that ecotype presently found on the 'Ewa Plains of Oahu and the Kawaihae-Waimea area on Hawaii (15). But periodic wildfires, slash-and-burn agriculture, and severe overgrazing ravaged Kaho'olawe for at least two centuries before World War II; today, the island is almost barren of natural vegetation. Approximately one-third of the island is virtually denuded; the remainder is dominated by *kiawe* (*Prosopis pallida*), an introduced shrub, and a variety of introduced grasses and forbs. The only native species contributing significant biomass are *pili* grass (*Heteropogon contortus*) and the shrubs *ma'o* (*Gossypium tomentosum* and *Abutilon incanum*), *'ilima* (*Sida fallax*), and *'uhaloa* (*Waltheria indica*).

From 1987 to 1993, the U.S. Army Construction Engineering Research Laboratories (USACERL) worked with the U.S. Navy to develop a cost-effective land rehabilitation prescription for Kaho'olawe. As part of that effort, a study was undertaken to determine, as nearly as possible, the original plant species of the island. This report, containing former and extant plant species, is the product of that study.

Objective

The objective of this study was to provide a list of all plant species that have existed on Kaho'olawe as part of a natural resources data base for use in future land rehabilitation efforts on the island.

Approach

A literature search and field observations were compiled to determine the historical presence and fate of the plants of Kaho'olawe.

2 A Vegetative History

Pre-European Conditions

The demise of Kaho'olawe began long before the arrival of European explorers. The cumulative effects of slash-and-burn agriculture practiced by the early Hawaiian people undoubtedly contributed to the loss of the scrub forest (24). Intense interisland warfare in the years just prior to the arrival of European explorers left the island "nearly over-run with weeds, and exhausted of. . . inhabitants" (36). In 1779, members of the crew of Captain James Cook described Kaho'olawe as "barren," "desolate," and an "altogether poor island" (12).

The Ranching Era

The same explorers that lamented the poor condition of Kaho'olawe unwittingly contributed to its further decline. Captain Cook and other early visitors introduced goats to the Hawaiian islands as gifts to the native monarchy near the end of the 18th century. It has been speculated that some of the goats were subsequently placed on Kaho'olawe (6). Although numerous visits were made to Kaho'olawe over the next half-century, the presence of goats was not actually recorded until 1850 when the explorer E.T. Perkins characterized the island as "desolate in the extreme; the reddish, sterile soil being unrelieved by either tree or shrub" (29). Perkins mentions a grove of "akokoa shrubs" (*Chamaesyce* spp.) and a few stunted *wiliwili* trees (*Erythrina sandwicensis*), many of the former having died after being stripped of bark by goats. Some sizeable expanses of grassland were also present, at least on the lower slopes. Perkins mentions that a group of his men set fire to the grass as a signal to their companions, and that the fire burned for nearly a week, serving as a beacon to passing ships.

In 1858, William F. Allen sighted and killed a single goat, although he speculated that there were considerably more (1). Allen also reported to R.C. Wyllie, co-owner of a 20-year lease of Kaho'olawe, that the island could support 20,000 sheep. The first sheep apparently arrived the following year (48), beginning a series of ill-fated ranching enterprises. By 1875 there were approximately 20,000 sheep and several hundred goats present (2). Six years later, cattle were introduced (4), and by 1884 there were about 9000 goats, 2000 sheep, 200 head of cattle, and 40 horses on the island (11).

The many years of human and animal activity scarred Kaho'olawe's soil. Severe wind erosion was noted as early as 1880 (3), with reports of red clouds of dust

being blown 30 to 40 miles out to sea. By 1910 it was apparent that the carrying capacity of the island—the ability of the environment to support livestock—had been vastly exceeded. To protect the limited remaining resources, the island was declared a forest reserve (21). Numerous forays were organized over the next 8 years to eradicate the livestock, but the goats and sheep persisted. There were also unsuccessful attempts to reestablish woody vegetation (7). Charles N. Forbes of the Bernice Pauahi Bishop Museum visited Kaho'olawe during this period and recorded a total of 16 native plant species and 15 introduced species (17).

By 1918 the economic demand for Kaho'olawe as a cattle ranch, and the failed attempts to eradicate the goats, the unsuccessful reestablishment of trees, and lack of funds to continue these efforts led the governor of the Hawaiian Islands to withdraw Kaho'olawe from the forest reserve (8). Cattle were reintroduced that year under the terms of a lease requiring the elimination of the goat population and the establishment of steps toward reforestation. Over the next two decades, thousands of native and introduced tree seedlings were planted (10) but with limited success (30). Also, several tons of native and introduced grass and forb seeds were planted (10). More than 13,000 goats were either removed or destroyed. Despite these gallant efforts, the goats persisted in small numbers and great clouds of eroded dust continued to blow off the island (23). In 1931 E.H. Bryan recorded 33 species of plants, adding 3 native species and 12 introduced species to the list recorded by Forbes in 1913 (13).

The Military Era

With the onset of World War II, the U.S. military subleased Kaho'olawe for training purposes. The cattle and horses were subsequently removed, but without ranch hands to control them, the small bands of sheep and goats reproduced rapidly. In 1953 President Eisenhower issued an Executive Order "reserving Kaho'olawe. . . for the use of the United States for naval purposes and placing it under the jurisdiction of the Secretary of the Navy" until such a time as it might be "no longer needed for naval purposes. . ." The Executive Order also required the Navy to "eradicate from the island all cloven-hooved animals. . ." or limit their population to less than 200.

When compared to the results of overgrazing, the effects of military activity on the flora of Kaho'olawe have been minimal. The Navy instituted a successful program to eradicate the goats and sheep (16) and established several revegetation projects that have allowed the vegetation to begin a remarkable recovery. In 1978 a botanical survey revealed 106 plant species living on Kaho'olawe, including 27 endemic and indigenous species (16). Two years later, 52 species, including 5

more natives, were added to the list (14). A survey conducted by the Hawai'i Heritage Program in 1992 recorded a total of 139 species, adding 5 native species, including a previously undescribed genus (18).

3 Species Checklist

The checklist provided in this report combines information from all of the aforementioned surveys with numerous other published accounts of species living on Kaho'olawe. The checklist includes species that have been cultivated for food, fiber, or ornamental purposes, and those that have been introduced to Kaho'olawe for land rehabilitation and erosion control. Species known to have been planted by seed during revegetation trials, but for which there is no evidence of germination, have been excluded. Species known only from drift material or archaeological sites have been excluded because it is impossible to conclude that they ever lived on Kaho'olawe. First-hand accounts of sightings or collections were the preferred sources of information due to the unreliability of second-hand information. However, even some first-hand accounts are inconclusive, especially those referring to species by common names only. Because there is often more than one species with the same common name, such references are included only where there is a reasonable degree of assurance that the common name corresponds to a single species.

The origin of each species in the checklist is listed as follows:

E Species occurring naturally only on Kaho'olawe or elsewhere within the Hawaiian Archipelago (*i.e., endemic*)

I Species occurring naturally on Kaho'olawe, but also known to occur naturally outside the Hawaiian Archipelago (*i.e., indigenous*)

N Species introduced to Hawaii by man that have been considered thoroughly established on Kaho'olawe at some time (*i.e., naturalized*)

C Species that have been *cultivated* on Kaho'olawe for food, fiber, or as an ornamental, but have not become naturalized

R Species introduced to Kaho'olawe for the purpose of land *rehabilitation* that have not become naturalized

For endemic and indigenous species, the earliest published source documenting occurrence on Kaho'olawe is provided. If these species have also been planted on Kaho'olawe, sources are listed for all documented accounts of successful establishment. For naturalized species, the first source documenting a naturalized population is provided along with sources for all documented introductions where

such information is available. For cultivated species or species planted for the purpose of land rehabilitation, sources are listed for all documented accounts of successful establishment. The source numbers correspond to the numbered references in the References section of this report.

Some species currently or formerly occurring on Kaho'olawe are considered by the U.S. Fish and Wildlife Service to be extinct or threatened to some degree (34, 35). The following categories are used to describe the endangerment status:

- e Species that are *endangered* to the point that survival is questionable
- c_1 Species that are first priority *candidates* for listing as threatened or endangered based on substantial evidence to support such an action
- c_2 Species that are *candidates* for listing as threatened or endangered, but for which adequate evidence is currently unavailable
- x Species that are believed to be *extinct* throughout the Hawaiian Archipelago
- k This category has been added by the authors of this report to indicate species that have been recorded as living on Kaho'olawe but which are considered to be no longer present.

Whether some reported species have ever occurred on Kaho'olawe is questionable. The following codes are used to identify those species:

- ~ Species reported only from second-hand sources
- ? Species questioned by the Hawai'i Heritage Program due to the absence of properly identified specimens in the Bishop Museum.

	ORIGIN	SOURCE(S)	STATUS
ADIANTACEAE			
Adiantum hispidulum Sw.	N	18	
Rough maidenhair			
AGAVACEAE			
Agave sisalana Perrine	N	17	
Century plant, sisal, *malina*			
Cordyline fruticosa (L.) A. Chev.	C	32	k
Ti, *kī*			
Pleomele aurea (H. Mann) N.E. Brown	R	28	
Hala pepe, le'ie			
AIZOACEAE			
Sesuvium portulacastrum (L.) L.	I/R	16/28	
Sea purslane, *'ākulikuli*			
AMARANTHACEAE			
Amaranthus spinosus L.	N	16	
Spiny amaranth, *pakai kukū*			
Amaranthus viridis L.	N	16	
Slender amaranth, *pakai, 'āheahea, pākaikai*			
Nototrichium sandwicense (A. Gray) Hillebr.	E	37	?
Kulu'ī			
ANACARDIACEAE			
Mangifera indica L.	N	37	k
Mango, *manakō, manakō meneke, meneke*			
APIACEAE			
Daucus pusillus Michx.	C	10	k
Carrot			
APOCYNACEAE			
Catharanthus roseus (L.) G. Don	N	37	?
Madagascar periwinkle, *kīhāpai*			
Nerium indicum L.	R	42	
Oleander			

ARACEAE			
Colocasia esculenta (L.) Schott Taro, *kalo*	C	17	~k
ARALIACEAE			
Reynoldsia sandwicensis A. Gray *'Ohe, 'ohe kukuluae'o, 'ohe makai, 'oheokai*	E	17	~k
ARAUCACEAE			
Araucaria heterophylla (Salisb.) Franco Norfolk Island pine	R	45	k
ARECACEAE			
Cocos nucifera L. Coconut palm, *niu, ololani*	N	9	
ASCLEPIADACEAE			
Asclepias curassavica L. Butterfly weed, bloodflower, *laulele, lauhele, nu'umela, pua 'anuhe*	N	16	
Asclepias physocarpa (E. Mey.) Schlechter Balloon plant	N	16	
Calotropis gigantea (L.) W.T. Aiton Crown flower, *puakalaunu*	N	14	
ASPLENIACEAE			
Asplenium adiantum-nigrum L. -	I	18	
ASTERACEAE			
Acanthospermum australe (Loefl.) Kuntze Spiny-bur, Paraguay bur, *kūkae hipa, 'ihi kūkae hipa, pipili*	N	17	
Ageratina riparia (Regel) R. King & H. Robinson Spreading mist flower, *hāmākua pāmakani*	N	18	
Ageratum conyzoides L. *Maile hohono, maile honohono, maile kula*	N	16	
Artemisia australis Less. *'Āhinahina, hinahina, hinahina kuahiwi*	E/R	37/28	
Bidens alba (L.) DC var. ***radiata*** (Schultz-Bip.) Ballard ex Melchert Spanish needle, beggartick, *ko'oko'olau, ko'olau*	N	37	
Bidens mauiensis (A. Gray) Sherff Spanish needle, beggartick, *ko'oko'olau, ko'olau*	E	16	
Bidens pilosa L. *Kī, kī nehe, kī pipili, nehe*	N	49	

Centaurea melitensis L.	N	14	
Napa thistle, yellow star thistle			
Cirsium vulgare (Savi) Ten.	N	14	
Bull thistle, *pua kala*			
Conyza bonariensis (L.) Cronq.	N	14	
Hairy horseweed			
Conyza canadensis (L.) Cronq. var. ***pusilla*** (Nutt.) Cronq.	N	49	
Horseweed, *lani wela*			
Crassocephalum crepidioides (Benth.) S. Moore	N	18	
-			
Emilia coccinea (Sims) G. Don	N	13	
Flora's paintbrush			
Emilia fosbergii Nicolson	N	14	
-			
Emilia sonchifolia (L.) DC	N	49	
Flora's paintbrush			
Flaveria trinervia (Spreng.) C. Mohr	N	40	
-			
Galinsoga parviflora Cav.	N	16	
-			
Gnaphalium purpureum L.	N	14	
Purple cudweed			
Heterotheca grandiflora Nutt.	N	13	
Telegraph weed			
Hypochoeris glabra L.	N	14	
Smooth cat's ear			
Hypochoeris radicata L.	N	14	
Hairy cat's ear, gosmore			
Lactuca serriola L.	N	18	
Prickly lettuce			
Lipochaeta bryanii Sherff	E	13	x
Nehe			
Lipochaeta connata (Gaud.) DC	E	20	
Nehe			
Lipochaeta integrifolia (Nutt.) A. Gray	E	37	?
Nehe			
Lipochaeta lavarum (Gaud.) DC	E/R	16/28	
Nehe			
Lipochaeta rockii Sherff	E	14	
Nehe			
Lipochaeta succulenta (Hook. & Arnott) DC	E	37	?
Nehe			
Montanoa hibiscifolia Benth.	N	18	
Tree daisy			

Pluchea indica (L.) Less.	N	14	
Indian fleabane, Indian pluchea			
Pluchea symphytifolia (Mill.) Gillis	N	16	
Sourbush			
Sigesbeckia orientalis L.	N	16	
Small yellow crown-beard			
Sonchus oleraceous L.	N	27	
Sow thistle, *pualele*			
Synedrella nodiflora (L.) Gaertn.	N	14	
Nodeweed			
Tridax procumbens L.	N	13	
Coat buttons			
Verbesina encelioides (Cav.) Benth. & Hook.	N	13	
Golden crown-beard			
Vernonia cinerea (L.) Less var. ***parviflora*** (Reinw.) DC	N	16	
Litte ironweed			
Xanthium strumarium L. var. ***canadense*** (Mill.) Torr. & A. Gray	N	13	
Cocklebur, *kīkānia*			
Zinnia peruviana (L.) L.	N	49	
Pua pihi			
BATACEAE			
Batis maritima L.	N	49	
Pickleweed, *'ākulikuli kai*			
BORAGINACEAE			
Cordia subcordata Lam.	R	42,45	k
Kou			
Heliotropium anomalum Hook. & Arnott	I/R	47/28	
Hinahina, hinahina kū kahakai, pōhinahina			
Heliotropium curassavicum L.	I	16	
Seaside heliotrope, *kīpūkai, nena*			
Tournefortia argentea L. f.	R	42,45	k
Tree heliotrope			
BRASSICACEAE			
Brassica oleracea L. var. ***capitata*** L.	C	10	k
Cabbage			
Coronopus didymus (L.) Sm.	N	16	
Swinecress			
Lepidium bidentatum Montin			
var. ***o-waihiense*** (Cham & Schlechtend.) Fosb.	I	18	
'Ānaunau, 'ānounou, kūnānā, naunau			
Lepidium oblongum Small	N	14	
-			

Raphanus sativus L. Wild radish	N	14	
Sisymbrium altissimum L. Tumble mustard	N	14	
BROMELIACEAE			
Ananas cosmosus (L.) Merr. Pineapple, *hala kahiki*	C	27	k
CACTACEAE			
Hylocereus undatus (Haw.) Britton & Rose Night-blooming cereus, *pāniniokapunahou, pāpipi pua*	N	37	?k
Opuntia cochenillifera (L.) Mill. Cochineal cactus	R	32	k
Opuntia ficus-indica (L.) Mill. Prickly pear, *pānini, pāpipi*	N	1	
CANNABACEAE			
Cannabis sativa L. subsp. ***indica*** (Lam.) E. Small & Cronq. Marijuana, *paka lōlō*	C	16	k
CAPPARACEAE			
Capparis sandwichiana DC *Maiapilo, pilo, pua pilo*	E	17	c_2
CARICACEAE			
Carica papaya L. Papaya, *mīkana, hē'ī, milikana, papaia*	C	10	k
CARYOPHYLLACEAE			
Polycarpon tetraphyllum (L.) L. -	N	16	
CASUARINACEAE			
Casuarina equisetifolia L. Common ironwood, *paina*	R	32,42,45	
Casuarina glauca Siebold ex Spreng. Longleaf or saltmarsh ironwood	R	45	
Casuarina quadrivalvis Labill. Drooping she oak	R	22	
CHENOPODIACEAE			
Atriplex canescens (Pursh) Nutt. Four-wing saltbush	R	45	k

Atriplex semibaccata R. Br.	N	19	
Australian saltbush			
Atriplex suberecta Verd.	N	18	
Saltbush			
Beta vulgaris L.	C	10	k
Beet			
Chenopodium carinatum R. Br.	N	16	
Goosefoot			
Chenopodium murale L.	N	37	
Goosefoot, *'āheahea*			
Chenopodium oahuense (Meyen) Aellen	R	28	
'Āheahea, 'ahea, 'āhewahewa, alaweo, 'āweoweo, kāha'iha'i			
Salsola kali L.	N	49	
Russian thistle, tumbleweed			
CLUSIACEAE			
Calophyllum inophyllum L.	R	10,42,45	k
Alexandrian laurel, *kamani, kamanu*			
COMBRETACEAE			
Terminalia catappa L.	R	42	k
Tropical or Indian almond, false *kamani, kamani haole, kamani 'ula*			
CONVOLVULACEAE			
Bonamia menziesii A. Gray	R	28	
-			
Cressa truxillensis Kunth	I	37	
-			
Ipomea batatas (L.) Lam.	C	10,29,46	k
Sweet potato, *'uala, 'uwala*			
Ipomoea cairica (L.) Sweet	N	17	
Ivy-leaved morning glory, *koali 'ai, koali, koali lau manamana, kowali, pa'ali'i*			
Ipomoea indica (J. Burm.) Merr.	I	14	
Koali 'awa, koali 'awahia, koali pehu			
Ipomoea pes-caprae (L.) R. Br. subsp. ***brasiliensis*** (L.) Ooststr.	I	17	
Beach morning glory, *põhuehue, puhuehue*			
Ipomoea tuboides Degener & Ooststr.	E	16	
Hawaiian moon flower			
Jacquemontia ovalifolia (Choisy) H. Hallier			
subsp. ***sandwicensis*** (A. Gray) K. Robertson	E	13	
Pā'ūohi'iaka, kākuaohi'iaka, kaupo'o			
Merremia aegyptia (L.) Urb.	N	17	
Hairy merremia, *koali kua hulu, kuahulu*			

CUCURBITACEAE			
Citrullus lanatus (Thunb.) Matsum. & Nakai	C	9,10	k
Watermelon, *ipu, ipu haole*			
Cucumis dipsaceus Ehrenb. ex Spach	N	14	
Hedgehog or teasel gourd			
Cucumis sativus L.	C	16	k
Cucumber			
Cucurbita maxima Duchesne ex Lam.	C	1	k
Pumpkin			
Lagenaria siceraria (Molina) Standl.	C	27	k
Calabash gourd, *ipu 'awa'awa*			
Momordica charantia L.	N	37	?
Balsam pear			
Sicyos pachycarpus Hook. & Arnott	E	37	
Kūpala			
CUPRESSACEAE			
Cupressus sempervirens L.	R	42	
Mediterranean cypress			
CYPERACEAE			
Carex meyenii Nees	I	37	?
-			
Eleocharis calva Torr.	I	37	
Spikerush, *kohekohe, pīpīwai*			
Mariscus javanicus (Houtt.) Merr. & Metcalfe	R	28	
'Ahu'awa, 'ehu'awa			
Mariscus phleoides Nees ex Kunth subsp. ***phleoides***	E	18	
-			
DIOSCOREACEAE			
Dioscorea sp. L.	N	25	~k
Yam			
EBENACEAE			
Diospyros sandwicensis (A. DC) Fosb.	R	28,45	
Lama, ēlama			
EPACRIDACEAE			
Styphelia tameiameiae (Cham. & Schlechtend.) F. v. Muell.	I	17	~k
Pūkiawe, 'a'ali'i mahu, kānehoa, maiele, maieli, puakeawe, puakiawe, pukeawe, pūpūkiawe			

EUPHORBIACEAE			
Aleurites moluccana (L.) Willd.	R	10,28	k
Kukui, kuikui			
Chamaesyce celastroides (Boiss.) Croizat & Degener			
var. ***amplectens*** (Sherff) Degener & I. Degener	E	14	
Spurge, *'akoko, koko, 'ekoko, kōkōmālei*			
var. ***stokesii*** (C. Forbes) Degener & I. Degener	E	37	?
Spurge, *'akoko, koko, 'ekoko, kōkōmālei*			
Chamaesyce hirta (L.) Millsp.	N	17	
Hairy or garden spurge, *koko kahiki*			
Chamaesyce hypericifolia (L.) Millsp.	N	49	
Graceful spurge			
Chamaesyce multiformis (Hook. & Arnott) Croizat & Degener			
var. ***microphylla*** (Boiss.) Degener & I. Degener	E	33	?
'Akoko, koko, 'ekoko, kōkōmālei			
Chamaesyce prostrata (Aiton) Small	N	49	
Prostrate spurge			
Chamaesyce skottsbergii (Sherff) Croizat & Degener			
var. ***vaccinioides*** (Sherff) Koutnik	E	37	c_2
'Akoko, koko, 'ekoko, kōkōmālei			
Chamaesyce thymifolia (L.) Millsp.	N	17	
Spurge			
Euphorbia heterophylla L.	N	37	?
Spurge, kaliko			
Ricinus communis L.	N	16	
Castor bean, *pā'aila, ka'apehā, kamākou, kolī, lā'au 'aila*			
FABACEAE			
Gen. et sp. nov.	E	18	
(new genus)			
Acacia confusa Merr.	N	42	
Formosa *koa*			
Acacia farnesiana (L.) Willd.	N	17	
Klu, aroma, *kolū*			
Acacia implexa Benth.	R	43,45	
Twisted wattle			
Acacia koa A. Gray	R	28,41,42,45	
Koa, koai'a, koai'e, koa 'ohā			
Acacia mangium Willd.	R	45	k
Wattle			
Albizia lebbeck (L.) Benth.	R	43	k
Siris tree, woman's tongue			
Cajanus cajan (L.) Millsp.	N	19	
Pigeon pea, *pī nūnū, pī Pokoliko*			

Chamaecrista nictitans (L.) Moench subsp. ***patellaria*** (DC ex Collad.) H. Irwin & Barneby var. ***glabrata*** (Vogel) H. Irwin & Barneby	N	16	
Partridge pea, *lauki*			
Crotalaria incana L.	N	14	
Fuzzy rattlepod, *kīkaehoki*			
Desmanthus virgatus (L.) Willd.	N	49	
Slender or virgate mimosa			
Desmodium sandwicense E. Mey.	N	27	
Spanish or chili clover, *pua pilipili, kīkānia pipili*			
Desmodium tortuosum (Sw.) DC	N	14	
Florida beggarweed			
Desmodium triflorum (L.) DC	N	17	
Three-flowered beggarweed			
Erythrina sandwicensis Degener	E/R	29/28,41,42,45	
Wiliwili			
Glycine wightii (Wight & Arnott) Verdc.	N/R	14/39,42,45	
Glycine			
Indigofera suffruticosa Mill.	N	49	
Indigo, *'inikō, 'inikoa, kolū*			
Leucaena leucocephala (Lam.) de Wit	N	13	
Koa haole, ēkoa, lilikoa			
Macroptilium atropurpureum (DC) Urb.	R	39	
Siratro			
Macroptilium lathyroides (L.) Urb.	N	13	
Wild bean, cow pea			
Mimosa pudica L. var. ***unijuga*** (Duchass. & Walp.) Griseb.	N	17	
Sensitive plant, sleeping grass, *pua hilahila*			
Phaseolus vulgaris L.	C	10	k
String beans			
Pisum sativum L.	C	10	k
Garden peas			
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	N	5	
Algaroba, mesquite, *kiawe*			
Senna gaudichaudii (Hook. & Arnott) H. Irwin & Barneby	N/R	18/28	
Kolomona, heuhiuhi, kalamona, uhiuhi			
Sesbania grandiflora (L.) Poir.	R	42	k
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Sesbania tomentosa Hook. & Arnott	E	16	c_1
'Ohai			
Sophora chrysophylla (Salisb.) Seem.	E/R	2/10,28	
Māmane, mamani			
Stylosanthes fruticosa (Retz.) Alston	R	45	k
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Stylosanthes humilis Kunth Townsville lucerne	R	45	k
Tephrosia purpurea (L.) Pers. var. ***purpurea*** Fish poison, *'auhuhu, ahuhu, 'auhola, hola*	N/R	16/45	
Tephrosia vogelii Hook. f. Fish poison tree	R	45	k
Vigna o-wahuensis Vogel -	E	37	c_1
GENTIANACEAE			
Centaurium erythraea Raf. subsp. ***erythraea*** Bitter herb, European centaury	N	14	
GOODENIACEAE			
Scaevola coriacea Nutt. Dwarf *naupaka*	R	28,45	e
Scaevola sericea Vahl Beach naupaka, *naupaka kahakai, huahekili, naupaka kai*	I/R	47/42,45	
HEMIONITIDACEAE			
Pityrogramma calomelanos (L.) Link Goldfern	N	18	
HERNANDIACEAE			
Gyrocarpus americanus Jacq. American gyrocarp	R	42	k
LAMIACEAE			
Ocimum gratissimum L. Basil	N	18	
LILIACEAE			
Aloe vera L. Aloe	C	40	
MALVACEAE			
Abutilon grandifolium (Willd.) Sweet Hairy abutilon, *ma'o*	N	14	
Abutilon incanum (Link) Sweet Hoary abutilon, *ma'o*	I	17	
Abutilon menziesii Seem. *Ko'oloa 'ula*	R	28,41	e
Gossypium tomentosum Nutt. ex Seem. Hawaiian cotton, *ma'o, huluhulu*	E/C/R	17/10/28,41,45	

Hibiscus brackenridgei A. Gray	E/R	37/28	c_1
Ma'o hau hele			
Hibiscus tiliaceous L.	R	28	
Hau			
Malva parviflora L.	N	16	
Cheese weed			
Malvastrum coromandelianum (L.) Garcke subsp. ***coromandelianum***	N	16	
False mallow			
Sida fallax Walp.	I	13	
'Ilima			
Sida rhombifolia L.	N	37	
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Sida spinosa L.	N	18	
Prickly sida			
Thespesia populnea (L.) Sol. ex Corrêa	R	28,42,45	
Portia tree, *milo*			
MELIACEAE			
Melia azedarach L.	R	42	k
Chinaberry, Pride-of-India, *'īnia, 'ilinia*			
MORACEAE			
Broussonetia papyrifera (L.) Venten.	N/C	37/10	
Paper mulberry, *wauke, po'a'aha*			
Ficus microcarpa L. fil.	N	40	
Chinese or Malayan banyan			
MUSACEAE			
Musa sp. L.	C	17	~k
Banana, *mai'a*			
MYOPORACEAE			
Myoporum sandwicense A. Gray	I/R	18/28,45	
Bastard sandalwood, *naio, naeo, naieo*			
MYRTACEAE			
Eucalyptus camaldulensis Dehnh.	R	42,43,45	
Red river gum, Murray red gum			
Eucalyptus citriodora Hook.	R	42	
Lemon-scented gum			
Eucalyptus globulus Labill.	R	42	k
Blue gum			
Eucalyptus punctata DC	R	45	
Grey gum			

Eucalyptus robusta Sm. Swamp mahogany	R	42	k
Eucalyptus sideroxylon A. Cunn. ex Woolls Red ironbark, mugga	R	42,45	
Eucalyptus tereticornis Sm. Forest red gum	R	42	k
Eucalyptus torelliana F. Muell. Cadaga	R	45	k
Metrosideros polymorpha Gaud. *'Ōhi'a, 'ōhi'a lehua, lehua*	R	10	k
Psidium guajava L. Guava, *kuawa, kuawa ke'oke'o, kuawa lemi, kuawa momona, puawa*	N	32	k
Syzygium malaccense (L.) Merr. & Perry Mountain or Malay apple, *'ōhi'a 'ai, 'ōhi'a, 'ōhi'a 'ai ke'oke'o, 'ōhi'a hākea, 'ōhi'a kea, 'ōhi'a leo, 'ōhi'a 'ula*	R	10	k
NEPHROLEPIDACEAE			
Nephrolepis multiflora (Roxb.) Jarrett ex Morton *Kupukupu, ni'ani'au*	N	14	
NYCTAGINACEAE			
Boerhavia coccinea Mill.	N	37	
Boerhavia glabrata Blume *Alena, nena*	I	37	?
Boerhavia herbstii Fosb. *Alena*	E	14	
Boerhavia repens L. *Alena, nena*	I	37	
OLEACEACE			
Noronia emarginata (Lam.) Thouars ex Hook. Madagascar olive	R	42	k
OPHIOGLOSSACEAE			
Ophioglossum concinnum Brack. *Pololei*	E	18	c_1
OXALIDACEAE			
Oxalis corniculata L. Yellow wood sorrel, *'ihi 'ai, 'ihi 'awa, 'ihi maka 'ula, 'ihi mākole*	N	16	

PANDANACEAE			
Pandanus tectorius S. Parkinson ex Z	R	42,45	k
Screwpine, *hala, pū hala*			
PAPAVERACEAE			
Argemone glauca (Nutt. ex Prain) Pope var. ***glauca***	E/R	13/28	
Prickly poppy, *pua kala, kala, naule, pōkalakala*			
Argemone mexicana L.	N	17	
Mexican poppy			
PHYTOLACCACEAE			
Phytolacca dioica L.	R	44,45	k
'Ombu			
PINACEAE			
Callitris columellaris F. Muell.	R	42	k
Murray River pine			
Callitris endlicheri (Parlot.) F.M. Bailey	R	42	k
Black cypress pine			
Pinus brutia Ten.	R	42,45	k
Brutia pine			
Pinus halapensis Mill.	R	43	k
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PLUMBAGINACEAE			
Plumbago zeylanica L.	I/R	37/45	k
Leadwort, *'ilie'e, hilie'e, 'ilihe'e*			
POACEAE			
Bothriochloa ischaemum (L.) Keng	R	39	
Yellow bluestem			
Bothriochloa pertusa (L.) A. Camus	N	49	
Pitted beardgrass			
Buchloë dactyloides (Nutt.) Engelm.	R	39	
Buffalograss			
Cenchrus ciliaris L.	N/R	16/39,42,45	
Buffelgrass			
Cenchrus echinatus L.	N	27	
Common sandbur, *'ume'alu, mau'u kukū*			
Cenchrus tribuloides L.	N	18	
Dune sandbur			
Chloris barbata (L.) Sw.	N	13	
Swollen fingergrass, *mau'u lei*			

Chloris divaricata R. Br. var. ***divaricata***	N	14	
Stargrass			
Chloris truncata R. Br.	R	14	
Stargrass			
Chloris virgata Sw.	N	49	
Feather fingergrass			
Chrysopogon aciculatus (Retz.) Trin.	I	2	
Golden beardgrass, *mānienie 'ula, pi'ipi'i, pilipili 'ula*			
Cynodon dactylon (L.) Pers.	N/R	17/39,42,45	
Common bermudagrass, *mānienie, mānienie haole*			
Cynodon plectostachyus (K. Schum.) Pilg.	R	42,45	
Starrgrass			
Dactyloctenium aegyptium (L.) Willd.	N	49	
Beach wiregrass			
Dichanthium aristatum (Poir.) Hubb.	N	49	
Wilder grass			
Dichanthium sericeum (R. Br.) A. Camus	N	37	
Australian bluestem			
Digitaria ciliaris (Retz.) Koeler	N	16	
Henry's crabgrass, *kūkaepua'a*			
Digitaria eriantha Steud.	R	45	
Fingergrass			
Digitaria insularis (L.) Mez ex Ekman	N	16	
Sourgrass			
Digitaria pentzii Stent	N/R	37/42,45	
Pangola grass			
Echinochloa colona (L.) Link	N	14	
Jungle-rice			
Ehrharta calycina Sm.	R	45	k
Perennial veldtgrass			
Eleusine indica (L.) Gaertn.	N	14	
Goosegrass, wiregrass, *mānienie ali'i*			
Eragrostis atropioides Hillebr.	E	14	
Lovegrass			
Eragrostis cilianensis (All.) Link	N	16	
Stinkgrass			
Eragrostis curvula (Schrad.) Nees	R	39,45	
Weeping lovegrass			
Eragrostis supurba Peyritsch	R	45	
Lovegrass			
Eragrostis tenella (L.) P. Beauv. ex Roem. & Schult.	N	14	
Japanese lovegrass, *hākonakona*			
Eragrostis variabilis (Gaud.) Steud.	E/R	26/28	
Kāwelu, 'emoloa, kalamālō			

Heteropogon contortus (L.) P. Beauv. ex Roem. & Schult.	I/R	2/10,42,45	
Twisted beardgrass, tanglehead, *pili* grass, *pili, lule*			
Ischaemum byrone (Trin.) Hitchc.	R	28	c_1,k
Hilo ischaemum			
Leptochloa uninervia (K. Presl) Hitchc. & Chase	N	40	
Sprangletop			
Lolium multiflorum Lam.	R	39	
Italian ryegrass			
Melinis minutiflora P. Beauv.	N	32	
Molasses grass			
Panicum fauriei Hitchc.			
var. ***fauriei***	E	14	
Panic grass			
var. ***latius*** (St.John) Davidse	E	14	
Panic grass			
Panicum maximum Jacq.	N/R	13/39,42,45	
Guinea grass, green panicgrass			
Panicum ramosius Hitchc.	E	37	
Panic grass			
Panicum torridum Gaud.	E	49	
Torrid panicgrass, *kākonakona*			
Panicum xerophilum (Hillebr.) Hitchc.	E	31	
Kākonakona			
Paspalum dilatatum Poir.	N	22	
Dallis grass			
Pennisetum polystachion (L.) Schult.	N	16	?
Feathery pennisetum			
Rhynchelytrum repens (Willd.) Hubb.	N/R	16/10	
Natal redtop, Natal grass			
Saccharum officinarum L.	C	1,27	k
Sugar cane, *ko'ula*			
Setaria gracilis Kunth	N	18	
Yellow or perennial foxtail, *mau'u Kaleponi*			
Setaria leucopila (Scribn. & Merr.) K. Schum.	R	39	
Plains bristlegrass			
Setaria verticillata (L.) P. Beauv.	N	49	
Bristly foxtail, *mau'u pilipili*			
Sporobolus indicus (L.) R. Br.	N	38	
West Indian dropseed, smutgrass			
Sporobolus virginicus (L.) Kunth	I/R	13/28	
Seashore rushgrass, beach dropseed, *'aki'aki, 'aki, mahiki, māhikihiki, mānienie, mānienie 'aki'aki, mānienie māhikihiki, mānienie maoli*			

Tragus berteronianus Schult. Burgrass, bertero goatgrass	N	16	
POLYGONACEAE			
Coccoloba uvifera (L.) L. Sea grape	R	42,45	k
POLYPODIACEAE			
Phymatosorus scolopendria (N.L. Burm.) Pic.-Ser. *Laua'e*	N	18	
PORTULACACEAE			
Portulaca lutea Sol. ex G. Forster Purslane, *'ihi*	I	17	?
Portulaca molokiniensis Hobdy Purslane, *'ihi*	E	37	c_2
Portulaca oleracea L. Pigweed, *'ākulikuli kula, 'ākulikuli lau li'i, 'ihi*	N	16	
Portulaca pilosa L. -	N	18	
Portulaca sclerocarpa A. Gray *Po'e, 'ihi, ihi mākole*	E	20	c_1
Portulaca villosa Cham. Purslane, *'ihi*	E	37	c_2
PRIMULACEAE			
Anagallis arvensis L. Scarlet pimpernel, poor man's weatherglass	N	37	
PROTEACEAE			
Grevillea robusta A. Cunn. ex R. Br. Silk, silver or he oak, *'oka kilika, ha'ikū ke'oke'o*	R	26	k
RHAMNACEAE			
Alphitonia ponderosa Hiliebr. *Kauila, kauwila*	R	28	
Colubrina asiatica (L.) Brongn. *'Ānapanapa, kauila 'ānapanapa, kauila kukuku, kukuku*	R	28	
Gouania hillebrandii Oliver -	E	37	e,k
RHIZOPHORACEAE			
Rhizophora mangle L. American or red mangrove	N	16	

ROSACEAE			
Osteomeles anthyllidifolia (Sm.) Lindl.	R	28,41	
'Ūlei, u'ulei			
RUBIACEAE			
Canthium odoratum (G. Forster) Seem.	R	28	
Alahe'e, 'ōhe'e, walahe'e			
Coffea arabica L.	C	10,27	
Arabian coffee			
Morinda citrifolia L.	R	28	
Indian mulberry, *noni*			
SANTALACEAE			
Exocarpos gaudichaudii A. DC	E	37	$?c_2$
Hulumoa, kaumahana			
Santalum ellipticum Gaud.	E/R	32/28	
Coast sandalwood, *'iliahialo'e*			
Santalum paniculatum Hook. & Arnott	E	20	
Sandalwood, *'iliahi*			
SAPINDACEAE			
Dodonea viscosa Jacq.	I/R	27/28,41,45	
'A'ali'i, 'a'ali'i kū makani, 'a'ali'i kū ma kua, kūmakani			
SINOPTERIDACEAE			
Doryopteris decipiens (Hook.) J. Sm.	E	17	
Kumuniu			
Doryopteris decora Brack.	E	16	?
Desert doryopteris, *'iwa'iwa*			
SOLANACEAE			
Lycium sandwicense A. Gray	I	17	
'Ōhelo kai, 'ae'ae, 'ākulikuli 'ae'ae, 'ākulikuli kai, 'ākulikuli 'ōhelo			
Lycopersicon esculentum Mill.	N	14	
Tomato, *'ōhi'a lomi, kamako, 'ōhi'a, 'ōhi'a haole*			
Lycopersicon pimpinellifolium (Jusl.) Mill.	N	49	
Currant tomato, 'ōhi'a ma ka nahele			
Nicotiana glauca R.C. Graham	N	17	
Tree tobacco, mustard tree, *mākāhala, paka*			
Nicotiana tabacum L.	C	27	k
Tobacco, *paka*			
Solanum americanum Mill.	I	49	
Glossy nightshade, *pōpolo, 'olohua, polopolo*			

Solanum linnaeanum Hepper & P. Jaeger	N	14	
Apple of Sodom, thorny or yellow-fruited *popolo*, *pōpolo kīkānia*			
Solanum melongena L.	C	10	k
Eggplant			
Solanum tuberosum L.	C	1,10	k
Potato, *'uala kahiki*			
STERCULIACEAE			
Waltheria indica L.	I	17	
'Uhaloa, 'ala'ala pū loa, hala 'uhaloa, hi'aloa, kanakaloa			
TAMARICACEAE			
Tamarix aphylla (L.) H. Karst.	R	42,45	
Tamarisk			
THELYPTERIDACEAE			
Christella dentata (Forsk.) Browney & Jermy	I	14	
Oak fern			
Christella parasitica (L.) Levl.	N	18	
-			
THYMELAEACEAE			
Wikstroemia sp. Endl.	E	2	
'Ākia, kauhi			
URTICACEAE			
Neraudia sericea Gaud.	E	20	c_1,k
-			
Touchardia latifolia Gaud.	C	10	k
Olonā			
VERBENACEAE			
Lantana camara L.	N	17	
Lākana, lā'au kalakala, mikinolia hihiu, mikinolia hohono, mikinolia kukū			
Stachytarpheta dichotoma (Ruiz & Pav.) Vahl	N	49	
'Ōwī, oī			
Stachytarpheta jamaicensis (L.) Vahl	N	37	
Jamaica vervain, *ōwī, oī*			
Verbena litoralis Kunth	N	14	
Vervain, *ōwī, oī*			

ZYGOPHYLLACEAE		
Tribulus cistoides L.	I	17
Caltrop, *nohu, nohunohu*		

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